Grade 8
Mathematics

Bridge to Algebra

Notes to the Teacher	
Materials One copy of B1a for each student Transparency of B1a Answers are in B1b	***A1 Models for Addition and Subtraction of Integers*** Students work in small groups to review addition and subtraction of integers through the use of models. Distribute student copies of B1a, and place transparency B1a on the overhead. After inviting a student to read problem 1, ask the class the following questions: • From the problem, what operation should be used to determine the total number of CD's? *Addition* • From the "Addition Model" column, what do the "Y's" stand for? *The yellow counters, which we have used to model **positive** numbers.* • Why are there two rows in the model? *Because there are two numbers that need modeling.* Work through problem 2 with the class. • How can they model the "-2" in this problem? *Enter two "R's" – for red, or negative – in the second row of the model.* • What happens to one "Y" and one "R"? *They form a zero pair, and can be removed or crossed out.* Next work through the first subtraction problem at the top of the second column (#10). Ask the following questions: • Why are there two expressions for each of the subtraction problems in the second column? *It is simpler to work with the operation of addition than subtraction.* • How can you change an addition problem to a subtraction problem? *Subtracting a number is equivalent to adding the opposite number.* Allow student groups time to work through the remainder of the problems. Debrief by inviting students to the overhead to record and discuss their answers.
Materials One copy of B2a for each student Transparency of B2a Research has shown that students must "do" and then "undo" for complete comprehension. Answers are in B2b	***A2 Undoing Addition and Subtraction Models*** Students work in small groups to "undo" the modeling of addition and subtraction of integers. Distribute student copies of B2a and place transparency B2a on the overhead. Begin by questioning students on the first problem to make sure they understand how the problem was derived from the model. Next have students look at the subtraction problem, #9. Students should note that the first expression that was written from the model contained the operation of addition, and it was this expression that was changed to a subtraction problem. Allow groups time to complete the activity . Debrief by having students come to the overhead to record and discuss their answers. After making sure that students have understood the exercise, ask if problems in the first column (involving addition) could be changed to subtraction problems having the same solution *(yes)*. Choose several problems from the first column for students to respond with the correct subtraction problem.

	Notes to the Teacher
A3 Addition Rules	**Materials**
Students work in small groups to look at patterns and determine rules for addition of integers. Begin by distributing copies of B3a and placing transparency B3a on the overhead. Ask students the following questions: • Why would we want rules for the addition of integers? *Using rules are faster than drawing models – large numbers would require a lot of time to model. Also, when adding real or rational numbers it is difficult to model fractional parts.* • Why aren't we determining rules for subtraction? *It's not necessary – convert the subtraction problem to addition! There's no need for a separate set of rules!*	One copy of B3a for each student Transparency of B3a Answers are in B3b
Allow groups time to complete the activity. Note that some problems are introduced with the numerical expression, and some are introduced with the model. Students should be able to complete the activity with ease since they have worked these types of expressions in activities B1a and B2a.	
Debrief by inviting students to the overhead to record and discuss their answers.	

Notes to the Teacher

Materials
One copy of B4 for each student
Transparency of B4

A4 Multiplication of Rational Numbers

Students work in small groups to review the sign rules for multiplication of rational numbers. Begin by distributing copies of B4 to each student, and place transparency B4 on the overhead. The first set of problems deals with "positive x positive", the second set deals with "positive x negative", and the third set deals with "negative x negative".

Work problems 1 – 3 on the overhead with the whole class.

1.a. $^{+}3 \times {}^{+}4$
b. $^{+}3 \times 4$
c. $3 \times {}^{+}4$

2. Answers may vary, but in general, positive numbers are used more often that negative ones.

3.

Y	Y	Y	Y	
Y	Y	Y	Y	
Y	Y	Y	Y	

Allow student groups time to complete the remainder of the activity. Circulate during this time to make sure that students understand the modeling process. Debrief by inviting students to the overhead to record and discuss their answers.

Answers:
5. positive
6.

R	R	R	R	
R	R	R	R	
R	R	R	R	

7. -12 8. Use the commutative property to change the order of the numbers, so you can think of the problem as "three negative fours."
9. negative
10.

R	R	R	R	
R	R	R	R	
R	R	R	R	

Y	Y	Y	Y	
Y	Y	Y	Y	
Y	Y	Y	Y	

11. $^{+}12$ *12. positive 13. positive, negative*

A5 Testing the Rules

Students work in small groups to determine if the sign rules determined in activity B4 for multiplication of rational numbers work for division of rational numbers. Begin by distributing copies of B5 and the calculators, and placing transparency B5 on the overhead.

Ask students the following questions:

- What is the relationship of the operations of multiplication and division? *They are the inverse of each other – one "undoes" the other.*
- Do you think the sign rules for division will be the same or different from the sign rules for multiplication? *From the previous question, it would follow that the rules would be the same.*

Allow student groups time to work with their calculators to complete the activity. Debrief by having students come to the overhead to record and discuss their answers.

Answers:
1. $^{+}3$ 2. $\approx {}^{+}4.432$ 3. $\approx {}^{+}.580$
4. $^{+}3$ 5. $\approx {}^{+}4.432$ 6. $\approx {}^{+}.580$
7. yes
8. $^{-}3$ 9. $\approx {}^{-}4.432$ 10. $\approx {}^{-}.580$
11. $^{-}3$ 12. $\approx {}^{-}4.432$ 13. $\approx {}^{-}.580$
14. yes
15. Since multiplication and division are inverse operations, the same sign rules would hold for both operations.

Notes to the Teacher

Materials

One copy of B5 for each student
Transparency of B5

Scientific calculator for each student

Notes to the Teacher	
Materials Copy of Blackline Master B6 "Reading Math" for each student; Transparency of B6; colored pens or markers	***A6 Reading Math*** Give to each student a copy of Blackline Master B6 "Reading Math". Place a transparency of B6 on the overhead. Instruct the students to write a numeric sentence for each problem before solving. With a colored pen or marker, have each student circle or underline the word and the corresponding operation. Allow students time to complete individually. When students are finished, call various students to write their problem and answer on the transparency and circle the context clue word. Answers: 1. 10 + 15 = 25 *(together = addition)* 2. .25 (100) = 25 *(of = multiplication)* 3. 50 – (8 + 17) = 25 *(bought = adding; left = subtraction)*
Materials Copy of Blackline Master B7a "Translating Order of Operation" for each student; Transparency of B7a	***A7 Translating Order of Operations*** Allow students to work in pairs. Give each pair of students a copy of B7a "Translating Order of Operation". Instruct students there are three columns that they must fill. The numeric translation must have appropriate parentheses with the exact order of operation for the represented sentence. Note to students that the order of operation helps to determine what occurred first in each of the problems. The students will solve the numeric translation in the second column. In the third column the student must verify the correct answer and explain what happened to make the incorrect answer wrong. Monitor students as they work on the handout. The answer key is Blackline Master B7b.

Notes to the Teacher

A8 T-Shirts for Drama

Materials

One copy of B8 for each student
or
Transparency B8

Students work as a whole class to review graphing a linear function from a practical situation by completing a table of values. Begin by distributing copies of B8 to each student and placing transparency B8 on the overhead. Invite a student to read the opening paragraph describing the situation.

Ask students the following questions regarding the function, C = $25 + $10s

- What does the variable *C* stand for? *The total cost of the t-shirts*
- What does the variable *s* stand for? *The number of t-shirts purchased*
- What does the $25 value represent? *The price to draw the design*
- What does the $10 value represent? *The cost per shirt*

Allow students time to complete the table of values.

Number of Shirts	***Total Cost***		***Number of Shirts***	***Total Cost***
0	*25*		*10*	*125*
1	*35*		*15*	*175*
2	*45*		*20*	*225*
3	*55*		*25*	*275*
4	*65*		*30*	*325*
5	*75*		*35*	*375*

A9 Guess My Picture

Materials

Grid paper for each student
Rulers

Students work individually to practice plotting points on a coordinate grid by creating a dot-to-dot picture. Begin by distributing grid paper and rulers. Next explain the activity and write the directions on the board or overhead.

- Each student should draw a picture on his/her grid paper. The picture should extend into all four quadrants.
- After drawing the picture, the student should select points on the picture, and record their coordinates **in order** on a separate sheet of paper. <u>These coordinates must be accurate</u>, so students should double-check their work.
- Each student should give their list of points (coordinate pairs) to another student, who will in turn graph and connect the points in order to see the picture.

Debrief by having the student who created the picture determine if the pictures are accurate. Student work may be displayed around the room.

Notes to the Teacher	
Materials Blackline Masters B10 for each student; Transparency of B10	***A10 Review of Finite Differences*** Students will review finite differences with this opening activity. Hand out to each student Blackline Master B10. Allowed the students to independently work on the handout while you circulate, prompting and helping as you walk around. When sufficient number of students completes the task, call for individual students to go to the overhead or the board to **explain** their solutions. Be sure that the students justify their reasons and processes for the function rules by asking students to explain why the rules work. Ask if any students used alternate methods to determine the function rule. Validate those rules by checking ordered pairs from the table of values and generate what might be the next ordered pair. Answers: 1. $y = x + 2$ 2. $y = 3x$ *3.* $y = x - 2$ 4. $y = x^2$
Materials Blackline Master B11a Transparency of B11a Key is in B11b.	***A11 Multiple Representations of Functions*** Students will explore various representations of a function which will include graphs, tables, symbolic representations, and verbal descriptions or representations. Students have already looked at finite difference and writing a function rule for the tabular representation. In this lesson, all these representations will be connected again and students should be able to take any function representation and change to another. Give to each student a copy of B11a "Representation of Functions". Place the transparency on the overhead and begin to question different students various steps in order to work each portion of the table. Questioning should guide them through naming the ordered pairs, developing the function rule and writing a verbal description. Writing a verbal description will be more difficult for the students so guide them through various examples. There may be more than one scenario for each graph. Once the class has agreed on verbal representation, go back to the graph and ask the students to label the x-axis and the y-axis according to their descriptions. If the students have shown strong capabilities during the introductory activity, have them work in pairs as you circulate around the room. Even in more advanced groups writing the verbal description may be more difficult since the students may believe there is just one correct answer. Prior to this exercise you may wish to list various verbal examples to prepare the students.
Materials Blackline Master B12	**A12 Student Practice for Functions** Give to each student a copy of B12. Student may work in pairs or individually. Below are the key to the functions. 1. $y = 3x - 2$ 2. $y = \frac{3}{2}x$ 3. $y = -2x + 5$ 4. $y = x^2 + 1$ 5. $y = 3x + 2$ 6. $y = \frac{1}{2}x + \frac{1}{2}$ 7. $y = 2x + 1$ 8. $y = x^2$

B1a Models for Addition and Subtraction of Integers

Addition Problem	Addition Model	Solution		Subtraction Problem	Subtraction Model	Solution
1.Art has 6 CD's, Scott gives him 2 more. How many CD's does Art have?	$^{+}6 + ^{+}2$ Y Y Y Y Y Y Y Y	8 CD's		9.Art has 6 CD's. He gives 2 to Scott. How many CD's does Art have?	$^{+}6 - ^{+}2$ 0r $^{+}6 + ^{-}2$ Y Y Y Y Y Y R R	2 CD's
2. $^{+}6 + ^{-}2$				10. $^{+}6 - ^{-}2$ **Or** $^{+}6 + ^{+}2$		
3. $^{-}6 + ^{+}2$				11. $^{-}6 - ^{+}2$ **Or**		
4. $^{-}6 + ^{-}2$				12. $^{-}6 - ^{-}2$ **Or**		
5. $^{+}3 + ^{+}4$				13. $^{+}3 - ^{+}4$ **Or**		
6. $^{+}3 + ^{-}4$				14. $^{+}3 - ^{-}4$ **Or**		
7. $^{-}3 + ^{+}4$				15. $^{-}3 - ^{+}4$ **Or**		
8. $^{-}3 + ^{-}4$				16. $^{-}3 - ^{-}4$ **Or**		

Addition Problem	Addition Model	Solution		Subtraction Problem	Subtraction Model	Solution
1.Art has 6 CD's, Scott gives him 2 more. How many CD's does Art have?	$^{+}6 + ^{+}2$ Y Y Y Y Y Y Y Y	8 CD's		9.Art has 6 CD's. He gives 2 to Scott. How many CD's does Art have?	$^{+}6 - ^{+}2$ 0r $^{+}6 + ^{-}2$ Y Y Y Y Y Y R R	2 CD's
2. $^{+}6 + ^{-}2$	Y Y Y Y Y Y N N	4		10. $^{+}6 - ^{-}2$ **Or** $^{+}6 + ^{+}2$	Y Y Y Y Y Y Y Y	8
3. $^{-}6 + ^{+}2$	R R R R R R Y Y	-4		11. $^{-}6 - ^{+}2$ **Or** $^{-}6 + ^{-}2$	R R R R R R R R	-8
4. $^{-}6 + ^{-}2$	R R R R R R R R	-8		12. $^{-}6 - ^{-}2$ **Or** $^{-}6 + ^{+}2$	R R R R R R Y Y	-4
5. $^{+}3 + ^{+}4$	Y Y Y Y Y Y Y	7		13. $^{+}3 - ^{+}4$ **Or** $^{+}3 + ^{-}4$	Y Y Y R R R R	-1
6. $^{+}3 + ^{-}4$	Y Y Y R R R R	-1		14. $^{+}3 - ^{-}4$ **Or** $^{+}3 + ^{+}4$	Y Y Y Y Y Y Y	7
7. $^{-}3 + ^{+}4$	R R R Y Y Y Y	1		15. $^{-}3 - ^{+}4$ **Or** $^{-}3 + ^{-}4$	R R R R R R R	-7
8. $^{-}3 + ^{-}4$	R R R R R R R	-7		16. $^{-}3 - ^{-}4$ **Or** $^{-}3 + ^{+}4$	R R R Y Y Y Y	1

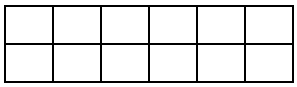
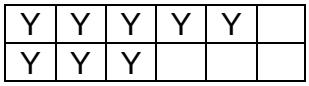
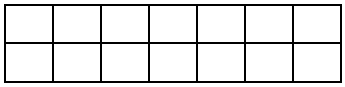
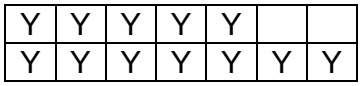
B2a Undoing Addition and Subtraction Models

Addition Problem	Addition Model	Solution		Subtraction Problem	Subtraction Model	Solution
1. $^{+}6 + ^{+}3$	Y Y Y Y Y Y Y Y Y	$^{+}9$		9. $^{+}6 + ^{+}3$ **Or $^{+}6$ - $^{-}3$**	Y Y Y Y Y Y Y Y Y	$^{+}9$
2.	Y Y Y Y Y Y R R R			10.	Y Y Y Y Y Y R R R	
3.	R R R R R R Y Y Y			11.	R R R R R R Y Y Y	
4.	R R R R R R R R R			12.	R R R R R R R R R	
5.	Y Y Y Y Y			13.	Y Y Y Y Y	
6.	Y Y Y Y R			14.	Y Y Y Y R	
7.	R R R R Y			15.	R R R R Y	
8.	R R R `R R			16.	R R R R R	

Addition Problem	Addition Model	Solution		Subtraction Problem	Subtraction Model	Solution
1. $^{+}6 + ^{+}3$	Y Y Y Y Y Y Y Y Y	$^{+}9$		9. $^{+}6 + ^{+}3$ **Or $^{+}6 - ^{-}3$**	Y Y Y Y Y Y Y Y Y	$^{+}9$
2. $^{+}6 + ^{-}3$	Y Y Y Y Y Y R R R	3		10. $^{+}6 + ^{-}3$ $^{+}6 - ^{+}3$	Y Y Y Y Y Y R R R	$^{+}3$
3. $^{-}6 + ^{+}3$	R R R R R R Y Y Y	$^{-}3$		11. $^{-}6 + ^{+}3$ $^{-}6 - ^{-}3$	R R R R R R Y Y Y	$^{-}3$
4. $^{-}6 + ^{-}3$	R R R R R R R R R	$^{-}9$		12. $^{-}6 + ^{-}3$ $^{-}6 - +3$	R R R R R R R R R	$^{-}9$
5. $^{+}4 + ^{+}1$	Y Y Y Y Y	$^{+}5$		13. $^{+}4 + ^{+}1$ $^{+}4 - ^{-}1$	Y Y Y Y Y	$^{+}5$
6. $^{+}4 + ^{-}1$	Y Y Y Y R	3		14. $^{+}4 + ^{-}1$ $^{+}4 - ^{+}1$	Y Y Y Y R	$^{+}3$
7. $^{-}4 + ^{+}1$	R R R R Y	$^{-}3$		15. $^{-}4 + ^{+}1$ $^{-}4 - ^{-}1$	R R R R Y	$^{-}3$
8. $^{-}4 + ^{-}1$	R R R `R R	$^{-}5$		16. $^{-}4 + ^{-}1$ $^{-}4 - ^{+}1$	R R R R R	$^{-}5$

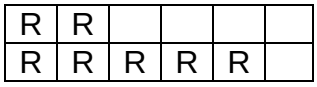
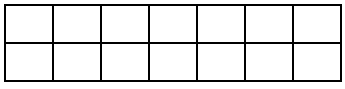
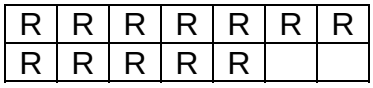
B3a Addition Rules

1. All numbers are positive.

Problem	Model	Solution
a. $^{+}4 + {}^{+}2$		
b.		
c. $^{+}1 + {}^{+}7$		
d.		

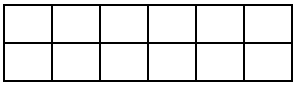
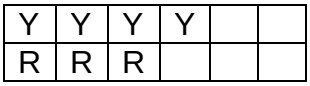
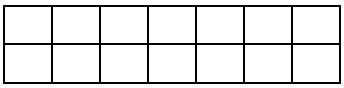
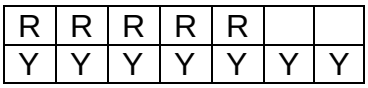
When adding all positive numbers, the sign of the answer will be (positive or negative), and you (add or subtract) the numbers.

2. All numbers are negative.

Problem	Model	Solution
a. $^{-}4 + {}^{-}2$		
b.		
c. $^{-}1 + {}^{-}7$		
d.		

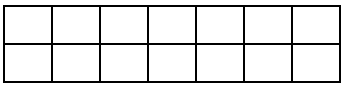
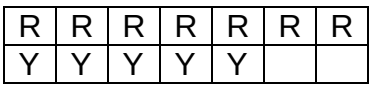
When adding all negative numbers, the sign of the answer will be (positive or negative), and you (add or subtract) the numbers.

3. There are more positive numbers than negative numbers.

Problem	Model	Solution
a. $^{+}4 + {}^{-}2$		
b.		
c. $^{-}1 + {}^{+}7$		
d.		

When adding more positive numbers than negative numbers, the sign of the answer will be (positive or negative), and you (add or subtract) the numbers.

4. There are more negative numbers than positive numbers.

Problem	Model	Solution
a. $^{-}4 + {}^{+}2$		
b.		
c. $^{+}1 + {}^{-}7$		
d.		

When adding all negative numbers, the sign of the answer will be (positive or negative), and you (add or subtract) the numbers.

1. All numbers are positive.

Problem	Model	Solution
a. $^{+}4 + {}^{+}2$	Y Y Y Y Y Y	6
b. $^{+}5 + {}^{+}3$	Y Y Y Y Y Y Y Y	8
c. $^{+}1 + {}^{+}7$	Y Y Y Y Y Y Y Y	8
d. $^{+}5 + {}^{+}7$	Y Y Y Y Y Y Y Y Y Y Y Y	12

When adding all negative numbers, the sign of the answer will be (**positive** or negative), and you (**add** or subtract) the numbers.

2. All numbers are negative.

Problem	Model	Solution
a. $^{-}4 + {}^{-}2$	R R R R R R	-6
b.	R R R R R R R	-7
c. $^{-}1 + {}^{-}7$	R R R R R R R R	-8
d. $^{-}7 + {}^{-}5$	R R R R R R R R R R R R	-12

When adding all negative numbers, the sign of the answer will be (positive or **negative**), and you (**add** or subtract) the numbers.

3. There are more positive numbers than negative numbers.

Problem	Model	Solution
a. $^{+}4 + {}^{-}2$	Y Y Y Y R R	$^{+}2$
b. $^{+}4 + {}^{-}3$	Y Y Y Y R R R	$^{+}1$
c. $^{-}1 + {}^{+}7$	R Y Y Y Y Y Y Y	$^{+}6$
d. $^{-}5 + {}^{+}7$	R R R R R Y Y Y Y Y Y Y	$^{+}2$

When adding more positive numbers than negative numbers, the sign of the answer will be (**positive** or negative), and you (add or **subtract**) the numbers.

4. There are more negative numbers than positive numbers.

Problem	Model	Solution
a. $^{-}4 + {}^{+}2$	R R R R Y Y	$^{-}2$
b. $^{+}2 + {}^{-}5$	Y Y R R R R R	$^{-}3$
c. $^{+}1 + {}^{-}7$	Y R R R R R R R	$^{-}6$
d. $^{-}7 + {}^{+}5$	R R R R R R R Y Y Y Y Y	$^{-}2$

When adding all negative numbers, the sign of the answer will be (positive or **negative**), and you (add or **subtract**) the numbers.

B4 Multiplication of Rational Numbers

The Easiest Ones:

1. We can write **3 x 4** with or without the positive signs. In the space below, rewrite 3 x 4 three ways using at least one positive sign each time.

   a. _____

   b. _____

   c. _____

2. Why do you think it is optional to use the positive sign?

   _____

3. Use the array below to model 3 x 4.
   (Hint: think of the problem as "three fours". The first "four" is modeled for you).

Y	Y	Y	Y	

4. Use the array to answer the question, 3 x 4 = _____.

5. If you are multiplying and both numbers are positive, the answer will be

   (positive or negative).

The Easier Ones:

6. We can think of **3 x -4** as "three negative fours". Use the array below to model 3 x -4. The first group of "negative four" is modeled for you.

R	R	R	R	

7. Use the array to answer the question, 3 x -4 = _____.

8. What could you do if someone asked you to multiply -4 x 3?

   _____

9. If you are multiplying two numbers and one is positive and one is negative, will the answer be (positive or negative)?

The Easy Ones:

10, Suppose you are asked to multiply **-3 x -4**. You can think of the negative sign on the 3 as the "opposite of". The problem then becomes "the opposite of three negative fours." Use the first array below to model "three negative fours", then use the second array to find "the opposite of three negative fours". The first negative four is modeled for you.

R	R	R	R	

Y	Y	Y	Y	

11. Use the second array to answer the question, -3 x -4 = _____

12. If you are multiplying two numbers and they are both negative, the answer will be (positive or negative)?

Making the rules easier!

13. Use the examples above to simplify the multiplication rules:

If the signs are the same the answer will be (positive or negative).

If the signs are different the answer will be (positive or negative).

B5 Testing the Rules

In the previous activity, we discovered that only two sign rules are needed for multiplication of numbers:

- **If the signs are the same, the answer will be positive.**
- **If the signs are different, the answer will be negative.**

Does division of numbers follow these same rules?
Use your calculator to determine the quotients of the following problems so that you can answer this question.

Rule: If the signs are the same, the answer will be positive.

1. $\frac{+12}{+4}$ = _____ 2. $\frac{+16.4}{+3.7}$ = _____ 3. $\frac{+5.63}{+9.7}$ = _____

4. $\frac{-12}{-4}$ = _____ 5. $\frac{-16.4}{-3.7}$ = _____ 6. $\frac{-5.63}{-9.7}$ = _____

7. Does this rule seem to hold for division? _____

Rule: If the signs are different, the answer will be negative.

8. $\frac{-12}{+4}$ = _____ 9. $\frac{-16.4}{+3.7}$ = _____ 10. $\frac{-5.63}{+9.7}$ = _____

11. $\frac{+12}{-4}$ = _____ 12. $\frac{+16.4}{-3.7}$ = _____ 13. $\frac{+5.63}{-9.7}$ = _____

14. Does this rule seem to hold for division? _____

15. Explain your answers to questions 7 and 14.
(Hint: what is the inverse operation of multiplication?)

_____

_____

_____

Translate the following verbal sentences into numeric sentences. Find the answer.

1. John spent $10 at the store and Jim spent $15. How much did they spend together?

2. Sarah deducts 25% of her paycheck for her college fund. If she is paid $100 a week, what does she save each check?

3. Mark's mom gave him $50 to buy new clothes. He bought a shirt for $8 and pants for $17. How much money did he have left?

Word sentences are given below for various situations. Translate the word sentences into numeric sentences, and show how to solve them. Select between the two possible answers and explain what made the wrong answer incorrect.

	Sentence	Numeric Translation	Solving	Possible Answers
1	Luke bought two Star Wars action figures, one for $5.00 and the other for $7.00. In a year the value of all figures doubled. What is the total present value of the figures?			17 or 24?
2	Juanita receives $3.00 per week for allowance. During report card week, she made four A's which she will receive $4.00 per A. How much money did Juanita receive during report card week?			11, 19, or 21?
3	Omar and his friends ordered 2 medium sizes of each three different types of pizzas. They will divide the pizzas between the four friends. How much pizza will each person eat?			3/8 or 3/2?
4	Taylor has a debit card with $10 credit and overdraft protection. Taylor spends $12 but deposits $15 shortly after. He buys lunch for $5 the next day. Later he adds $3.00 to the debit card. What is Taylor's final balance on his debit card?			-25 or 11?

	Sentence	Numeric Translation	Solving	Possible Answers
5	Lei-leen is preparing a square garden with a side that measures 5 feet long. In another part of the yard she is making a flower bed 3 feet wide and 5 feet long. What is the total area of Ling's gardens?			25, 33 or 40?
6.	Sasha receives $30 for allowance per week. She and her parents have agreed for anything she buys her parents and she will split the cost. Sasha bought a shirt for $6 and a skirt for $11. How much of Sasha's allowance does she have left after paying her share of the clothes?			6.50, 21.50, or 33?
7.	Bob had a garden that was 3 by 3 foot square. He decides to increase each side by 2 feet. What is the area of Bob's new garden?			13 or 25?
8.	Write your own problem.			What is the right answer? What is a possible wrong answer?

	Sentence	Numeric Translation	Solving	Possible Answers
1	Luke bought two Star Wars action figures, one for $5.00 and the other for $7.00. In a year the value of all figures doubled. What is the total present value of the figures?	$2(5 + 7)$	$2(12) = 24$	*17: multiplied 2 times 5 than added 7*
2	Juanita receives $3.00 per week for allowance. During report card week, she made four A's which she will receive $4.00 per A. How much money did Juanita receive during report card week?	$3+4(4)$	$3 + 16 = 19$	*11: added 3 + 4 + 4* *21: added 3 + 4 then multiplied by 3*
3	Omar and his friends ordered 2 medium sizes of each three different types of pizzas. They will divide the pizzas between the four friends. How much pizza will each person eat?	$2(3) \div 4$	$6 \div 4 = 6/4 = 3/2$	*3/8: divided 3 by 4 but inverted 2 to ½ for ½ times 3/4*
4	Taylor has a debit card with $10 credit and overdraft protection. Taylor spends $12 but deposits $15 shortly after. He buys lunch for $5 the next day. Later he adds $3.00 to the debit card. What is Taylor's final balance on his debit card?	$10 – 12 + 15 – 5 + 3$	$-2 + 15 – 5 + 3$ $13 – 5 + 3$ $8 + 3$ 11	*-25:All the addition was completed first without adjusting for signs*
5	Lei-leen is preparing a square garden with a side that measures 5 feet long. In another part of the yard she is making a flower bed 3 feet wide and 5 feet long. What is the total area of Ling's gardens?	$5^2+3(5)$	$25 + 15 = 40$	*25: operation 5(2) not 5^2* *33: adding 3 + 5 not multiplying*
6.	Sasha receives $30 for allowance per week. She and her parents have agreed for anything she buys her parents and she will split the cost. Sasha bought a shirt for $6 and a skirt for $11. How much of Sasha's allowance does she have left after paying her share of the clothes?	$30 - \frac{(6+11)}{2}$	$30 - \frac{(6+11)}{2} = 30 - \frac{17}{2}$ $= 30 - 8.50$ $= 21.50$	*6.50: divided by 2 after subtracting 17 from 30* *32.50: took ½ of 6, subtracted from 30 then added 5.50, half of 11*
7.	Bob had a garden that was 3 by 3 foot square. He decides to increase each side by 2 feet. What is the area of Bob's new garden?	$(3 + 2)^2$	$5^2 = 25$	*13: squared 3 and 2 before adding*
8.	Answers will vary.			

B8 T-Shirts for Drama

Students in Ms. Haven's drama class are going to buy t-shirts for their latest production. The price is $25 to determine and draw the design, plus $10 for each shirt. The function representing the total cost of the t-shirts is:

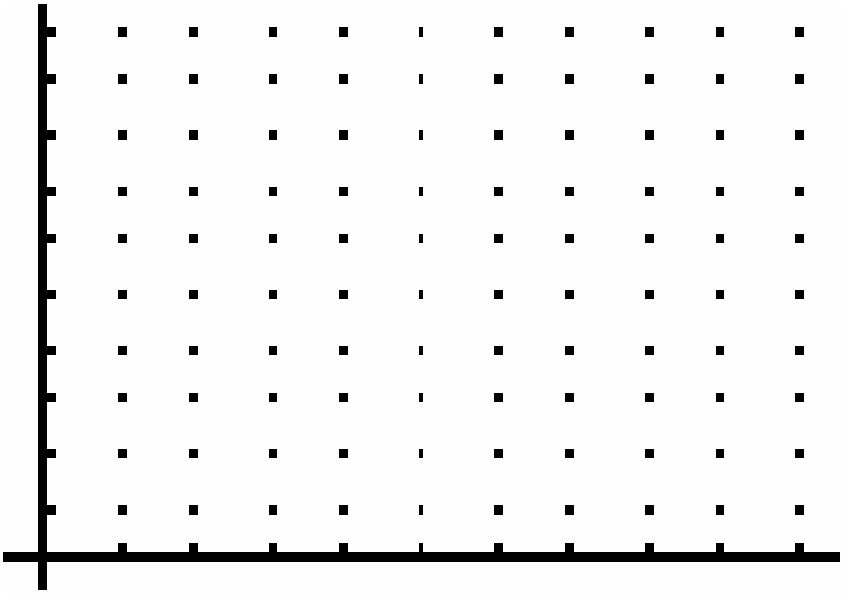
$$C = \$25 + \$10s$$

where C is the total cost and s is the number of shirts

1. Complete the table to determine the total cost of the shirts.

Number of Shirts	Total Cost		Number of Shirts	Total Cost
0			10	
1			15	
2			20	
3			25	
4			30	
5			35	

2. Graph the data on the grid below. Be sure to label your graph and axes, and write the scale on both axes.



B10 ***Review of Finite Differences***

Find the change in y and the change in x for each table of values. Then determine a rule for each table.

1. Function Rule: _____

	X	Y	
	0	2	
	1	3	
	2	4	
	3	5	
	4	6	

2. Function Rule: _____

	X	Y	
	0	0	
	1	3	
	2	6	
	3	9	
	4	12	

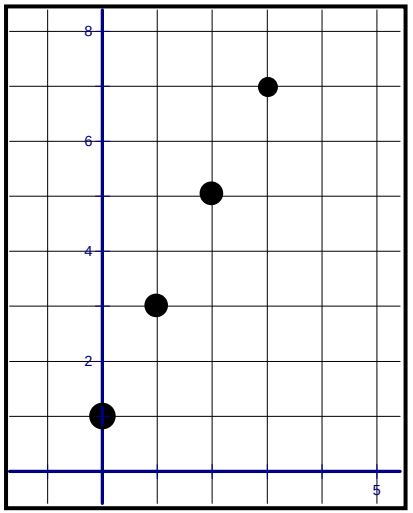
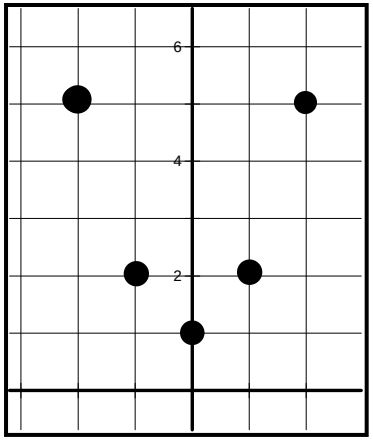
3. Function Rule: _____

	X	Y	
	0	-2	
	1	-1	
	2	0	
	3	1	
	4	2	

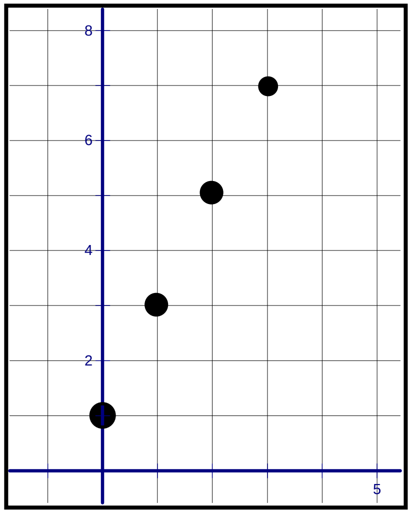
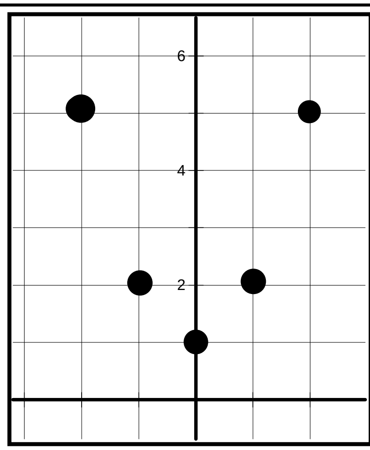
4. Function Rule: _____

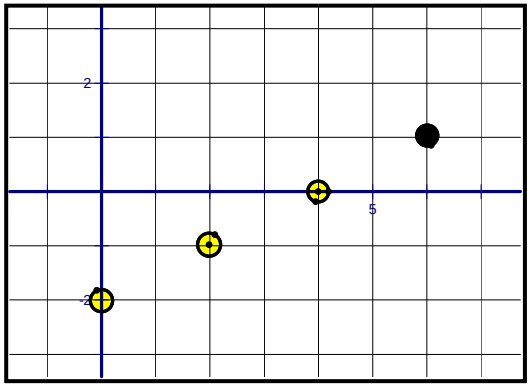
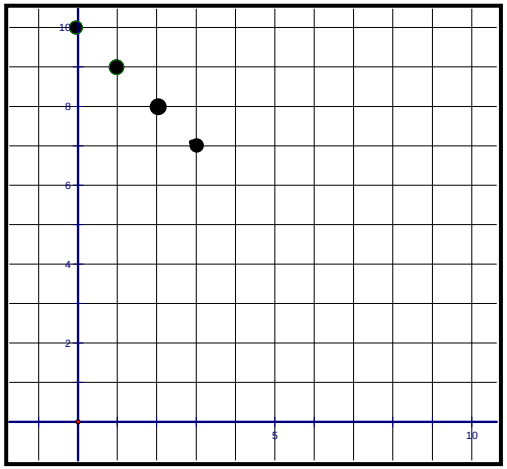
	X	Y	
	0	0	
	1	1	
	2	4	
	3	9	
	4	16	

Write the table for each of the graphs below. Find the function rule and write a verbal description that would demonstrate a real world situation. After writing your description, go back to the graph and label the axes appropriately.

	Graph	Table	Function Rule	Verbal Description
1.		x | y		
2.		x | y		

Verbal Description		
Function Rule		
Table		
Graph		
	3.	**4.**

<table>
<tr><th></th><th>Graph</th><th>Table</th><th>Function Rule</th><th>Verbal Description</th></tr>
<tr><td>1.</td><td> 
</td><td><table><tr><th>x</th><th>y</th></tr><tr><td>0</td><td>1</td></tr><tr><td>1</td><td>3</td></tr><tr><td>2</td><td>5</td></tr><tr><td>3</td><td>7</td></tr></table></td><td>$y = 2x + 1$</td><td>(Answers may vary) John's allowance is $1.00 a day. If he wishes to increase his allowance in must complete an extra chore for $2.00 each.</td></tr>
<tr><td>2.</td><td> 
</td><td><table><tr><th>x</th><th>y</th></tr><tr><td>-2</td><td>5</td></tr><tr><td>-1</td><td>2</td></tr><tr><td>0</td><td>1</td></tr><tr><td>1</td><td>2</td></tr><tr><td>2</td><td>5</td></tr></table></td><td>$y = x^2 + 1$</td><td>(answers may vary) Lilly receives a dollar for a good report card. For every "A" on her report card she receives extra that number squared.</td></tr>
</table>

	Graph	Table	Function Rule	Verbal Description
3.			$y = \frac{1}{2}x - 2$	*(Answers may vary) Bob broke two glass vases at Mr. Crystal's Emporium. In order to pay off his debt Bob must work 2 hours to pay for one vase. If he does a good job Mr. Crystal may hire Bob for a few hours a day.*
4.			$y = -x + 10$	*(Answers may vary) Juana's parents gave her $10 to spend at the school fair. Each activity costs a dollar each. How many activities may Juana do?*

x	y
0	-2
2	-1
4	0
6	1

x	y
0	10
1	9
2	8
3	7

Find the change of y and the change of x for each table of values. Then determine a rule for each table.

1.

	X	Y	
	0	-2	
	1	1	
	2	4	
	3	7	
	4	10	

Function Rule: _____

2.

	X	Y	
	0	0	
	2	3	
	4	6	
	6	9	
	8	12	

Function Rule: _____

3.

	X	Y	
	0	5	
	1	3	
	2	1	
	3	-1	

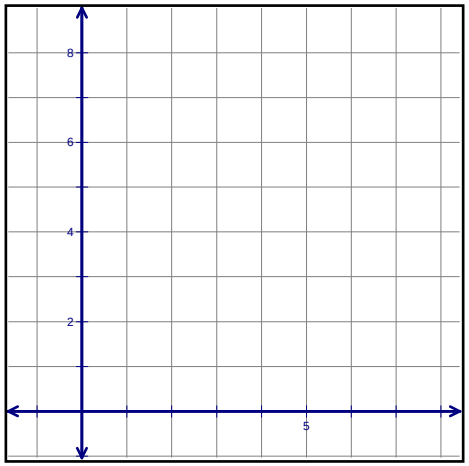
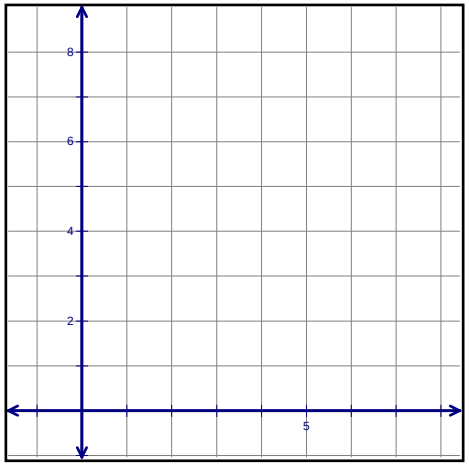
Function Rule: _____

4.

	X	Y	
	0	1	
	1	2	
	2	5	
	3	10	
	4	17	

Function Rule: _____

Write the table for each of the graphs below. Find the function rules and write a verbal description that would demonstrate a real world situation. After writing your description, go back to the graph and label the axes appropriately.

	Graph	Table	Function Rule	Verbal Description
5.				
6.				

x	y
0	2
1	5
2	8
3	11

x	y
-1	0
1	1
3	2
5	3
7	4

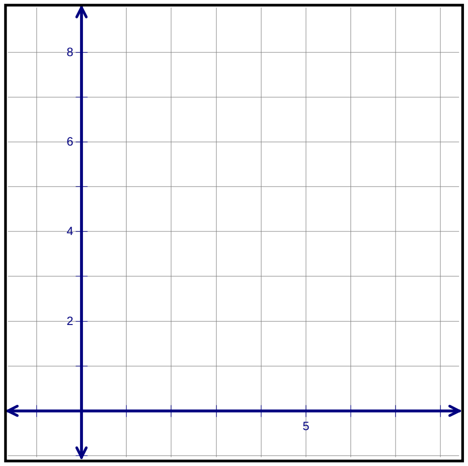
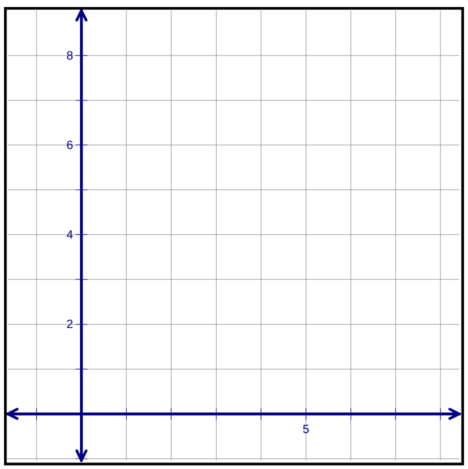
	Graph	Table	Function Rule	Verbal Description
7.		x / y: 0, 1; 1, 3; 2, 5; 3, 7		
8.		x / y: 0, 0; 1, 1; 2, 4; 3, 9		

Table for 7:

x	y
0	1
1	3
2	5
3	7

Table for 8:

x	y
0	0
1	1
2	4
3	9